General

Title

Uncontrolled diabetes admission: percentage of admissions for a principal diagnosis of diabetes without mention of short-term or long-term complications per 100,000 population, ages 18 years and older.

Source(s)

AHRQ QI research version 5.0. Prevention quality indicator 14 technical specifications: uncontrolled diabetes admission rate. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 2 p.

National Quality Forum measure information: uncontrolled diabetes admission rate (PQI 14). Washington (DC): National Quality Forum (NQF); 2014 Sep 18. 17 p.

Measure Domain

Primary Measure Domain

Related Population Health Measures: Population Use of Services

Secondary Measure Domain

Does not apply to this measure

Brief Abstract

Description

This measure is used to assess the percentage of admissions for a principal diagnosis of diabetes without mention of short-term (ketoacidosis, hyperosmolarity, or coma) or long-term (renal, eye, neurological, circulatory, or other unspecified) complications per 100,000 population, ages 18 years and older.

Rationale

Uncontrolled diabetes is more likely to occur in the elderly and those with other types of multimorbidity and physiological complexity. Despite medical advances and increased awareness of diabetes in both the lay and medical communities, few patients with diabetes broadly achieve targets for glucose management

and other preventative care interventions, as outlined in nationally accepted clinical guidelines. Better glycemic control can be achieved through: higher access to medical care in the ambulatory setting; appropriate medication and home glucose monitoring; better care coordination among providers; proper nutrition; patient education; and management of comorbid mental illness and/or cognitive decline. Special attention to the elderly and those with complex medical histories is needed, as they may be less likely to have classic symptoms of hyperglycemia and are more likely to demonstrate a slow decline. Symptom expression may also be masked by autonomic dysfunction and metabolic hormonal dysregulation associated with long-standing hyperglycemia as well as polypharmacy and other competing co-morbid conditions.

Diabetes is best treated in the outpatient setting. Hospitalizations due to uncontrolled diabetes may be decreased by improved outpatient diabetes management aimed at improving glycemic control. Reasons for admission may be directly related to physiologic causes or due to the cessation of treatment, lack of access to quality care, medication costs, and or other adherence related issues.

This measure is an avoidable hospitalization/ambulatory care sensitive condition (ACSC) type indicator. ACSC type indicators are not measures of hospital quality, but rather measures of potentially avoidable hospitalization if appropriate outpatient care, other healthcare services or community services were accessed and obtained (i.e., measures of the health care system broadly defined). These measures are designed to assess population access to timely, high quality outpatient and public health services in a particular geographic area, for the purpose of managing chronic disease or diagnosing acute illnesses before progressing to inpatient treatment. These measures are of most interest to comprehensive health care delivery systems, such as some health maintenance organizations (HMOs), accountable care organizations (ACOs) or public health agencies. ACSC indicators correlate with each other and they may be used in conjunction as an overall examination of outpatient care and access to care at a national, regional or county level.

Evidence for Rationale

> National Quality Forum measure information: uncontrolled diabetes admission rate (PQI 14). Washington (DC): National Quality Forum (NQF); 2014 Sep 18. 17 p.

Primary Health Components

Uncontrolled diabetes without mention of complication; ambulatory care sensitive condition (ACSC)

Denominator Description

Population ages 18 years and older in metropolitan area or county (see the related "Denominator Inclusions/Exclusions" field)

Numerator Description

Discharges, for patients ages 18 years and older, with a principal International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code for uncontrolled diabetes without mention of a short-term or long-term complication (see the related "Numerator Inclusions/Exclusions" field)

Evidence Supporting the Measure

Type of Evidence Supporting the Criterion of Quality for the Measure

A clinical practice guideline or other peer-reviewed synthesis of the clinical research evidence

A systematic review of the clinical research literature (e.g., Cochrane Review)

One or more research studies published in a National Library of Medicine (NLM) indexed, peer-reviewed journal

Additional Information Supporting Need for the Measure

A study using Healthcare Cost and Utilization Project (HCUP) data reported that the combination of uncontrolled diabetes (Prevention Quality Indicator [PQI] #14) and short-term diabetes complications (PQI #1) accounted for 36% of all diabetic related hospitalizations in 2004 at a cost of 1.3 billion dollars (Ahern & Hendryx, 2007). Once admitted, minorities have been shown to have longer average lengths of stays and incur higher costs (Kim et al., 2010; Shen & Washington, 2008). With the continuing rise in diabetes, along with the aging of the population, admissions for complications related to diabetes are expected to climb. Besides hospitalizations, acute diabetic complications are the seventh leading cause of death in the U.S. (2007) and are considerable source morbidity. Approximately 40% of elderly patients being admitted life-threatening hyperglycemia do not have a known history of diabetes (Wachtel, Silliman, & Lamberton, 1987; Gale, Dornan, & Tattersall, 1981).

Decreased admissions for diabetic complication over time have been reported for patients managed in systems with higher continuity of care (Menzin et al., 2010; Lin et al., 2008; Robbins, Valdmanis, & Webb, 2008), when endocrinologists provide routine care, and in those with organizations with pay-for-performance incentives (Chen et al., 2010). Innovative types of outpatient case management programs shown to effective in decreasing diabetic hospitalizations include: cluster or group visits (Ward, 2009; Steinsbekk et al., 2012), Care Coordination Home Telehealth for Veterans (Jia et al., 2009), and enhanced patient education (Steinsbekk et al., 2012; Robbins et al., 2008; Worswick et al., 2013).

Hospitalization rates for complications associated with diabetes vary substantially by race. Socioeconomic factors account for some but not all of these disparities (Kim et al., 2010; Shen & Washington, 2008). Disadvantaged patients are more likely to be admitted for acute complications of their diabetes (which are more easily preventable), as opposed to chronic complications and to be admitted through the emergency department (Kim et al., 2010; Shen & Washington, 2008). Once admitted, minorities have been shown to have longer average lengths of stays and incur higher costs. Blacks and Hispanics have been shown to less likely have coverage of Part B services (physician services) compared to whites. Additionally, Medicare patients without private insurance coverage of Part B services are less likely to self-monitor their blood glucose, have regular checkups, or receive treatment for hypertension or dyslipidemia (Harris, 1999). Persons with intellectual disabilities and mental health disorders have been shown to have an increased risk for hospitalization for diabetic related complications (Becker & Hux, 2011; Druss et al., 2012); however, not all studies are consistent (Leung et al., 2011). Older adults admitted with diabetic complications are more likely to have more comorbid conditions and more insidious symptom presentation. Approximately 40% of older patients presenting with severe hyperglycemia do not have a known history of diabetes.

Evidence for Additional Information Supporting Need for the Measure

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Becker T, Hux J. Risk of acute complications of diabetes among people with schizophrenia in Ontario, Canada. Diabetes Care. 2011 Feb;34(2):398-402. PubMed

Chen JY, Tian H, Taira Juarez D, Hodges KA, Brand JC, Chung RS, Legorreta AP. The effect of a PPO

pay-for-performance program on patients with diabetes. Am J Manag Care. 2010 Jan;16(1):e11-9. PubMed

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Gale EA, Dornan TL, Tattersall RB. Severely uncontrolled diabetes in the over-fifties. Diabetologia. 1981 Jul;21(1):25-8. PubMed

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Kim H, Ross JS, Melkus GD, Zhao Z, Boockvar K. Scheduled and unscheduled hospital readmissions among patients with diabetes. Am J Manag Care. 2010 Oct;16(10):760-7. PubMed

Leung G, Zhang J, Lin WC, Clark RE. Behavioral disorders and diabetes-related outcomes among Massachusetts Medicare and Medicaid beneficiaries. Psychiatr Serv. 2011 Jun;62(6):659-65. PubMed

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National Quality Forum measure information: uncontrolled diabetes admission rate (PQI 14). Washington (DC): National Quality Forum (NQF); 2014 Sep 18. 17 p.

Robbins JM, Thatcher GE, Webb DA, Valdmanis VG. Nutritionist visits, diabetes classes, and hospitalization rates and charges: the Urban Diabetes Study. Diabetes Care. 2008 Apr;31(4):655-60. PubMed

Robbins JM, Valdmanis VG, Webb DA. Do public health clinics reduce rehospitalizations?: the urban diabetes study. J Health Care Poor Underserved. 2008 May;19(2):562-73. PubMed

Shen JJ, Washington EL. Identification of diabetic complications among minority populations. Ethn Dis. 2008;18(2):136-40. PubMed

Steinsbekk A, Rygg LÃ˜, Lisulo M, Rise MB, Fretheim A. Group based diabetes self-management education compared to routine treatment for people with type 2 diabetes mellitus. A systematic review with meta-analysis. BMC Health Serv Res. 2012;12:213. PubMed

Wachtel TJ, Silliman RA, Lamberton P. Predisposing factors for the diabetic hyperosmolar state. Arch Intern Med. 1987 Mar;147(3):499-501. PubMed

Ward MM. Access to care and the incidence of end-stage renal disease due to diabetes. Diabetes Care. 2009 Jun;32(6):1032-6. PubMed

Worswick J, Wayne SC, Bennett R, Fiander M, Mayhew A, Weir MC, Sullivan KJ, Grimshaw JM. Improving quality of care for persons with diabetes: an overview of systematic reviews - what does the evidence tell us?. Syst Rev. 2013;2:26. PubMed

Extent of Measure Testing

Reliability Testing
The developer's metric of reliability is the signal to noise ratio, which is the ratio of the between county (area) variance (signal) to the within county (area) variance (noise). The formula is signal / (signal + noise). There is a county (area)-specific signal to noise ratio, which is used as an empirical Bayes univariate shrinkage estimator. The overall signal to noise ratio is a weighted average of the county (area)-specific signal-to-noise ratio, where the weight is $[1 / (signal + noise)^2]$. The signal is calculated using an iterative method. The analysis reports the reliability of the risk-adjusted rate (before applying the empirical Bayes univirate shrinkage estimator).

Overall the risk-adjusted rate is moderately reliable. Based on a norm of a signal-to-noise ratio of 0.80, 60% of counties (areas) exceed the norm. Reliability is less than the norm in counties with population less than approximately 15,000 persons, meaning that the performance score is reliability adjusted closer to the shrinkage target in those counties.

Validity Testing
The developer conducted construct validity testing to examine the association between the risk-adjusted rate and area structural characteristics potentially associated with quality of care, including prior performance, using regression analysis.

Given the stated rationale, the expectation for the regression analysis given the expected relationship between the "Less Access to High Quality Outpatient Care" construct validity measure (F1) and the county (area) risk-adjusted rate is a positive, statistically significant coefficient. The expectation for the regression analysis given the expected relationship between the "More Market Competition" construct validity measure (F2) and the county (area) risk-adjusted rate is a positive, statistically significant coefficient. The results are consistent with expectations. Also, past performance is a moderate predictor of current performance with a coefficient of 0.73.

Refer to the original measure documentation for additional measure testing information.

Evidence for Extent of Measure Testing

National Quality Forum measure information: uncontrolled diabetes admission rate (PQI 14). Washington (DC): National Quality Forum (NQF); 2014 Sep 18. 17 p.

State of Use of the Measure

State of Use

Current routine use

Current Use

not defined yet

Application of the Measure in its Current Use

Measurement Setting

Ambulatory/Office-based Care

Hospital Inpatient

Professionals Involved in Delivery of Health Services

not defined yet

Least Aggregated Level of Services Delivery Addressed

Regional, County or City

Statement of Acceptable Minimum Sample Size

Does not apply to this measure

Target Population Age

Age greater than or equal to 18 years

Target Population Gender

Either male or female

National Strategy for Quality Improvement in Health Care

National Quality Strategy Priority

Institute of Medicine (IOM) National Health Care Quality Report Categories

IOM Care Need

Not within an IOM Care Need

IOM Domain

Not within an IOM Domain

Data Collection for the Measure

Case Finding Period

Case Finding Period

The time period is one year.

Note: The reference population rates and signal variance parameters assume a one-year time period.

Denominator Sampling Frame

Geographically defined

Denominator (Index) Event or Characteristic

Geographic Location

Patient/Individual (Consumer) Characteristic

Denominator Time Window

not defined yet

Denominator Inclusions/Exclusions

Inclusions
Population ages 18 years and older in metropolitan area (MA) or county. Discharges in the numerator are assigned to the denominator based on the MA or county of the patient residence, not the MA or county of the hospital where the discharge occurred.

Note:

May be combined with diabetes short-term complications as a single indicator as a simple sum of the rates to form the *Healthy People 2010* indicator (note that the Agency for Healthcare Research and Quality [AHRQ] Quality Indicator [QI[TM]] excludes transfers to avoid double-counting cases).
The term MA was adopted by the United States (U.S.) Census in 1990 and referred collectively to metropolitan statistical areas (MSAs), consolidated metropolitan statistical areas (CMSAs), and primary metropolitan statistical areas (PMSAs). In addition, "area" could refer to either 1) Federal Information Processing Standard (FIPS) county, 2) modified FIPS county, 3) 1999 Office of Management and Budget (OMB) Metropolitan Statistical Area, or 4) 2003 OMB Metropolitan Statistical Area. Micropolitan Statistical Areas are not used in the QI software.
The denominator can be specified with the diabetic population only and calculated with the SAS QI software through the condition-specific denominator at the state-level feature.

Exclusions
Unspecified

Exclusions/Exceptions

not defined yet

Numerator Inclusions/Exclusions

Inclusions
Discharges, for patients ages 18 years and older, with a principal International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM) diagnosis code for uncontrolled diabetes without mention of a short-term or long-term complication

Note:

By definition, discharges with a principal diagnosis of uncontrolled diabetes without mention of short-term or long-term complications are precluded from an assignment of Major Diagnostic Categories (MDC) 14 by grouper software. Thus, obstetric discharges should not be considered in the Prevention Quality Indicator (PQI) rate, though the Agency for Healthcare Research and Quality (AHRQ) Quality Indicator (QI[TM]) software does not explicitly exclude obstetric cases.

Exclusions
Exclude cases:

Transfer from a hospital (different facility)
Transfer from a Skilled Nursing Facility (SNF) or Intermediate Care Facility (ICF)
Transfer from another health care facility
With missing gender (SEX=missing), age (AGE=missing), quarter (DQTR=missing), year (YEAR=missing), principal diagnosis (DX1=missing), or county (PSTCO=missing)

Numerator Search Strategy

Institutionalization

Data Source

Administrative clinical data

Type of Health State

Proxy for Health State

Instruments Used and/or Associated with the Measure

Unspecified

Computation of the Measure

Measure Specifies Disaggregation

Does not apply to this measure

Scoring

Rate/Proportion

Interpretation of Score

Does not apply to this measure (i.e., there is no pre-defined preference for the measure score)

Allowance for Patient or Population Factors

not defined yet

Description of Allowance for Patient or Population Factors

The predicted value for each case is computed using a hierarchical model (logistic regression with area random effect) and covariates for gender and age (in 5-year age groups). The reference population used

in the regression is the universe of discharges for states that participate in the Healthcare Cost and Utilization Project (HCUP) State Inpatient Data (SID) for the year 2010 (combined), a database consisting of 46 states and approximately 38 million adult discharges, and the United States (U.S.) Census data by county. The expected rate is computed as the sum of the predicted value for each case divided by the number of cases for the unit of analysis of interest (i.e., area). The risk adjusted rate is computed using indirect standardization as the observed rate divided by the expected rate, multiplied by the reference population rate.

Refer to the original measure documentation for the specific covariates for this measure.

Standard of Comparison

not defined yet

Identifying Information

Original Title

PQI 14: uncontrolled diabetes admission rate.

Measure Collection Name

Agency for Healthcare Research and Quality (AHRQ) Quality Indicators

Measure Set Name

Prevention Quality Indicators

Submitter

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Developer

Agency for Healthcare Research and Quality - Federal Government Agency [U.S.]

Funding Source(s)

Agency for Healthcare Research and Quality (AHRQ)

Composition of the Group that Developed the Measure

The Agency for Healthcare Research and Quality (AHRQ) Quality Indicator (QI) measures are developed by a team of clinical and measurement experts in collaboration with AHRQ. The AHRQ QIs are continually updated as a result of new research evidence and validation efforts, user feedback, guidance from the National Quality Forum (NQF), and general advances in the science of quality measurement.

Financial Disclosures/Other Potential Conflicts of Interest

None

Endorser

National Quality Forum - None

NQF Number

not defined yet

Date of Endorsement

2014 Sep 18

Adaptation

This measure was not adapted from another source.

Date of Most Current Version in NQMC

2015 Mar

Measure Maintenance

Measure is reviewed and updated on a yearly basis

Date of Next Anticipated Revision

Spring 2016 (version 6.0, including International Classification of Diseases, Tenth Revision, Clinical Modification [ICD-10-CM] and International Classification of Diseases, Tenth Revision, Procedure Coding System [ICD-10-PCS] compatible software)

Measure Status

This is the current release of the measure.

This measure updates previous versions:

> AHRQ QI. Prevention quality indicators #14: technical specifications. Uncontrolled diabetes admission rate [version 4.4]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2012 Mar. 2 p.
> AHRQ quality indicators. Prevention quality indicators: technical specifications [version 4.4]. Appendices. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2012 Mar. 6 p.

Measure Availability

Source available from the Agency for Healthcare Research and Quality (AHRQ) Quality Indicators (QI) Web site   .

For more information, contact the AHRQ QI Support Team at E-mail: QIsupport@ahrq.hhs.gov; Phone:

301-427-1949.

Companion Documents

The following are available:

AHRQ quality indicators. Prevention quality indicators (PQI) parameter estimates [version 5.0]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 21 p. This document is available from the AHRQ Quality Indicators Web site _____ .

AHRQ quality indicators. Prevention quality indicators benchmark data tables [version 5.0]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 9 p. This document is available from the AHRQ Quality Indicators Web site _____ .

AHRQ quality indicators. Prevention quality indicators (PQI) composite measure workgroup. Final report. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2006 Apr 7. various p. This document is available from the AHRQ Quality Indicators Web site _____ .

HCUPnet: a tool for identifying, tracking, and analyzing national hospital statistics. [Web site]. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); [accessed 2015 Sep 10]. HCUPnet is available from the AHRQ Web site _____ .

NQMC Status

This NQMC summary was completed by ECRI on December 19, 2002. The information was verified by the Agency for Healthcare Research and Quality on January 9, 2003.

This NQMC summary was updated by ECRI Institute on April 6, 2004, February 18, 2005, February 27, 2006, June 15, 2007, November 26, 2008 and May 22, 2010.

This NQMC summary was reviewed and edited by ECRI Institute on May 16, 2011.

This NQMC summary was retrofitted into the new template on July 13, 2011.

This NQMC summary was updated by ECRI Institute on February 22, 2013 and again on December 1, 2015. The information was verified by the measure developer on January 19, 2016.

Copyright Statement

No copyright restrictions apply.

Production

Source(s)

AHRQ QI research version 5.0. Prevention quality indicator 14 technical specifications: uncontrolled diabetes admission rate. Rockville (MD): Agency for Healthcare Research and Quality (AHRQ); 2015 Mar. 2 p.

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